FUEL-CELL INSTALLATION, METHOD FOR ACTIVATING AND DEACTIVATING SAID INSTALLATION

Examiner: K. Han SN: 10/592,979 Art Unit: 1727 April 11, 2011

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on March 17, 2004. It is noted, however, that applicant has not filed a certified copy of the Germany 10 2004 013 337.9 application as required by 35 U.S.C. 119(b).

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 11, it is unclear and indefinite as to what materials are included as defined by term "basic material" within the claim. For the purposes of examination it will be assumed the basic materials include any proton conducting polymer.

Regarding claim 12, it unclear as to which "operating temperature" the temperature regulating device is to be provided for. For the purposes of examination, it will be assumed the temperature referred to is the operating temperature of the fuel cell.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 9, 10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. (US 2002/0150799) in view of Antonucci et al. (US 6780537).

Regarding claims 9 and 10, Baumann discloses a heat and power plant comprised of a steam reformer heated with a gas burner (reformer stage; 2, 3; Figure 2) for reforming of hydrocarbons and steam, low temperature shift reactor/methanisation reactor (shift stage; 5, 6) downstream from the reformer that is connected at an outlet

end to the inlet connection of the anode of a fuel cell stack (8) without a heat exchanger, and the outlet connection of the anode of the fuel cell stack is connected to an air inlet of the gas burner (Figure 2) [0038] but is silent towards the fuel cell stack to be a high-temperature fuel cell stack having an operating temperature range between about 100℃ to about 200℃.

Antonucci teaches that fuel cells powered by hydrogen-containing gas mixtures coming from steam reforming or partial oxidation if provided with the polymeric membranes suitable for operation at medium temperature (100-160℃) (proton-conducting high-temperature electrolyte membrane; 2:59-3:22) permits flexibility in the fuel fed to the anode, elimination of the poisoning of catalysts by carbon monoxide, and increase in the oxygen kinetics of the of the fuel (1:57-64; 2:1-18; 3:23-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to operate the fuel cell stack of Baumann at a medium temperature range provided with a suitable medium temperature polymeric membrane because Antonucci recognizes that fuel cells powered by hydrogen-containing gas mixtures coming from steam reforming operated at a medium temperature range permits for the flexibility in the fuel fed to the anode, elimination of the poisoning of catalysts by carbon monoxide, and increase in the oxygen kinetics of the of the fuel.

Regarding claims 13-17, limitations which are directed to a manner of operating the disclosed device (e.g. “ passing preheated air ”, “ shutting down a hydrocarbon gas supply and a steam supply ”, etc.), it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim.

Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. and Antonucci et al. as applied to claim 10 above, and further in view of Melzner et al. (US 2005/0118476).

The teachings of Baumann and Antonucci as discussed above are herein incorporated.

Regarding claim 11, Baumann and Antonucci are silent towards the electrolyte membrane to comprise at least one basic material and at least one dopant where the dopant is a reaction product of an at least dibasic inorganic acid with an organic compound, and the reaction product has an unreacted acidic hydroxyl group of the inorganic acid or the condensation product of this compound with a polybasic acid.

Melzner teaches a proton-conducting electrolyte membrane comprising at least one base material and at least one dopant, which is the reaction product of an at least dibasic inorganic acid with an organic compound, comprising one acidic hydroxyl group or the condensation product of said compound with a polybasic acid because it has a high and constant mechanical stability and flexibility, excellent chemical and thermal stability, and a high and constant conductivity used in a wide temperature range from

50° C to more than 200° [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a proton-conducting electrolyte membrane comprising at least one base material and at least one dopant, which is the reaction product of an at least dibasic inorganic acid with an organic compound, comprising one acidic hydroxyl group or the condensation product of said compound with a polybasic acid as the electrolyte membrane of Baumann and Antonucci because Melzner teaches it has a high and constant mechanical stability and flexibility, excellent chemical and thermal stability, and a high and constant conductivity used in a wide temperature range from 50° C to more than 200°.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumann et al. and Antonucci et al. as applied to claim 9 above, and further in view of Clingerman et al. (US 6376112) and Melzner et al. (US 2005/0118476).

The teachings of Baumann and Antonucci as discussed above are herein incorporated.

Regarding claim 12, Baumann and Antonucci are silent towards a temperature regulating device provided to ensure the operating temperature of the fuel cell.

Clingerman teaches a controller (temperature regulating device, 150) which monitors the operation of the fuel cell including temperature and generates shutdown commands in response to selected conditions of the system (7:22-36, 61-67). Melzner further recognizes the polymeric membrane of the fuel cell has temperature ranges at which the electrolyte membrane has a high and constant mechanical stability, flexibility,

excellent chemical and thermal stability, and a high and constant conductivity used in a wide temperature range from 50° C to more than 200° [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to monitor the temperature of the fuel cell stack and control the operation or shutdown of the fuel cell based upon the temperature range at which the components such as the electrolyte membrane operate at optimal conditions because Clingerman and Melzner recognize that control systems can provide for meeting selected conditions such as operational temperature ranges for electrolyte membranes to provide high and constant mechanical stability, flexibility, excellent chemical and thermal stability, and a high and constant conductivity.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/K. H./
Examiner, Art Unit 1727

/Barbara L. Gilliam/
Supervisory Patent Examiner, Art Unit 1727